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Variable Oakleaf Caterpillar

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The variable oakleaf caterpillar (*Heterocampa manteo* (Dbldy.)) is a common insect in deciduous forests of Eastern North America. It has been recorded from most of the Eastern Canadian Provinces and most of the States in the East to North Dakota in the West and south to eastern Texas, Louisiana, and Mississippi. Heavy defoliations of hosts may occur anywhere within this range. Infestations have covered millions of acres and extended over hundreds of miles.

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Hosts

Larvae of this insect feed on the foliage of a large number of deciduous trees. All species of oaks are attacked; however, white oak is generally preferred. Infestations are commonly recorded on southern red, northern red, pin, willow, black, laurel, bur, and post oaks. Exotic oaks, beech, basswood, paper birch, and American elm also are attacked. Occasional hosts are walnut, black birch, hawthorn, eastern hophornbeam, apple, boxelder, and persimmon. This insect has been reported also on pinckneya or fever-bark, a rare tree that grows only along the coastal plain of the Southeastern United States.

Injury

Trees of all sizes are attacked by this insect. The greatest amount of feeding usually occurs in August or later; consequently, saplings or larger trees can withstand 2 or 3 consecutive years of extreme defoliation before mortality occurs. Infestations seldom last longer than 2 years, during which time tree vigor and growth are impaired. In severe outbreaks an occasional tree may be killed, but the major effect is unsightly defoliation that degrades forest recreation sites.

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Description

Pale, cream-colored, glossy eggs are laid on the lower leaf surface. The eggs are spherical and about 1/32 in (0.8 mm) in diameter. As the embryo develops, reddish bands appear (fig. 1). Just before hatching, purplish spots that are characteristic of coloration on the head of the young larva also appear (fig. 2).

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Figure 2.—Egg cluster of the variable oakleaf caterpillar just before hatching.

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Figure 1.—Newly laid egg cluster of the variable oakleaf caterpillar.

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Figure 3.—Fully grown larva of the variable oakleaf caterpillar.

The fully grown larva (fig. 3) is about 1-1/2 in (3.8 cm) long and sparsely covered with short hairs. An individual larva may change color as feeding continues. The head varies in color from amber brown to yellow to green. Two lateral, curved bands adorn each side of the head: the outer band, a creamy white; the inner band, a reddish brown to black. The overall body color may vary from pure green to yellow. A broad stripe, which is highly variable in shape and size, is often found on the back. The color of this stripe varies from light pink to dark red.

The pupa is about 1/2 in (1.3 cm) long, stout, dark reddish brown, and shiny. It has two small spines at the posterior tip.

The moth has a wing expanse of 1-1/2 to 1-3/4 in (3.8 to 4.4 cm). Each forewing may be light or dark ashy gray with three darker, wavy, and diffused lines and one inconspicuous black spot (fig. 4). The hindwings are light brown.

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Figure 4.—Adult moth of the variable oakleaf caterpillar.

Life History and Habits

One generation per year is normal in the northern areas of the variable oakleaf caterpillar's range. In areas south of a line extending from Virginia to Missouri, two generations have been reported. However, only one generation usually reaches outbreak population levels in any one place each year.

The insects overwinter as prepupae in cocoons under the leaf litter. Pupation usually occurs the following spring; in heavy outbreaks, however, over 50 percent of the insects may remain as prepupae for a second year or longer.

In the North, the moths begin to emerge near the end of June and continue to emerge through late July. Females lay their eggs in clusters of 30 to 300 on the lower surface of host leaves. Each female may lay as many as 500 eggs, which hatch in 5 to 7 days.

At first the young larvae feed gregariously, skeletonizing the lower surface of the leaves. As they become older, they consume all the foliage between the major veins. Larvae in the last stage account for about 85 percent of the defoliation.

When disturbed, larvae defend themselves by secreting formic acid from a gland on their ventral thorax. Prolonged or repeated handling of the larvae may cause blisters.

Larvae cease feeding early in September, drop to the ground, crawl into the duff, and spin their cocoons.

In the South, some moths may begin to emerge about mid-April or early May. Eggs are usually present by the end of April. Larvae hatch from these eggs in May, feed until late June or early July, and then pupate in cocoons in the leaf litter. Adult moths appear and lay eggs by late July. Second-generation larvae begin feeding by mid-August, paralleling the development of northern populations. Upon completion of feeding in September, they move to the ground and spin their cocoons. This generation overwinters as prepupae and pupates in April of the following year.

Development varies from year to year, depending on local weather conditions or latitude. In one instance in Arkansas, larvae were observed feeding in January.

Associated Insects

Variable oakleaf caterpillars are frequently found feeding with one or more other species of related Lepidoptera. Such combined feeding activity defoliates a stand of trees more severely than feeding by the oakleaf caterpillars alone. The most commonly associated species are the redhumped oakworm (*Symmerista canicosta* Fran.), the yellownecked caterpillar (*Datana ministra* (Drury)), the walnut caterpillar (*Datana integerrima* G. & R.), the saddled prominent (*Heterocampa guttivitta* (Wlkr.)), and the orangestriped oakworm (*Anisota senatoria* (J. E. Smith)). All these caterpillars belong to the variable oakleaf caterpillar family or are close relatives and have similar life histories and habits.

Natural Control

In years following large infestations, the egg parasites *Trichogramma* sp. and *Telenomus* sp. may kill 90 percent of the eggs. Nearly all egg masses have some parasitized eggs; only the eggs concealed within a cluster escape. This high level of parasitization, plus the failure of many prepupae to pupate in the spring, appear to be the major reasons for lack of consecutive heavy defoliations.

At least seven species of larval parasites attack variable oakleaf caterpillar larvae. The most important species are *Diradops bethunei* Cress (Ichneumonidae), *Protomicroplitus schizurae* (Braconidae), and *Lespesia schizurae* (Tachinidae). Combined larval parasitization may kill 90 percent of the larvae.

The large predatory ground beetles *Calosoma scrutator* (F.) and *C. calidum* (F.) feed on the variable oakleaf caterpillar. Adult checkered beetles and stink bugs often prey on small larvae. Most birds do not prey upon active larvae although prepupae have been found in the crops of ruffed grouse and wild turkeys.

Direct Control

Most outbreaks, although spectacular, subside before tree mortality occurs. Chemical control is generally neither necessary nor recommended over large areas. However, localized treatments using pesticides may be necessary in residential or recreation areas. Persons encountering high populations of larvae should consult their county extension agent, State agricultural experiment station, or State or Federal forest office to obtain current information concerning recommended control procedures and materials.

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